

FIG. 1

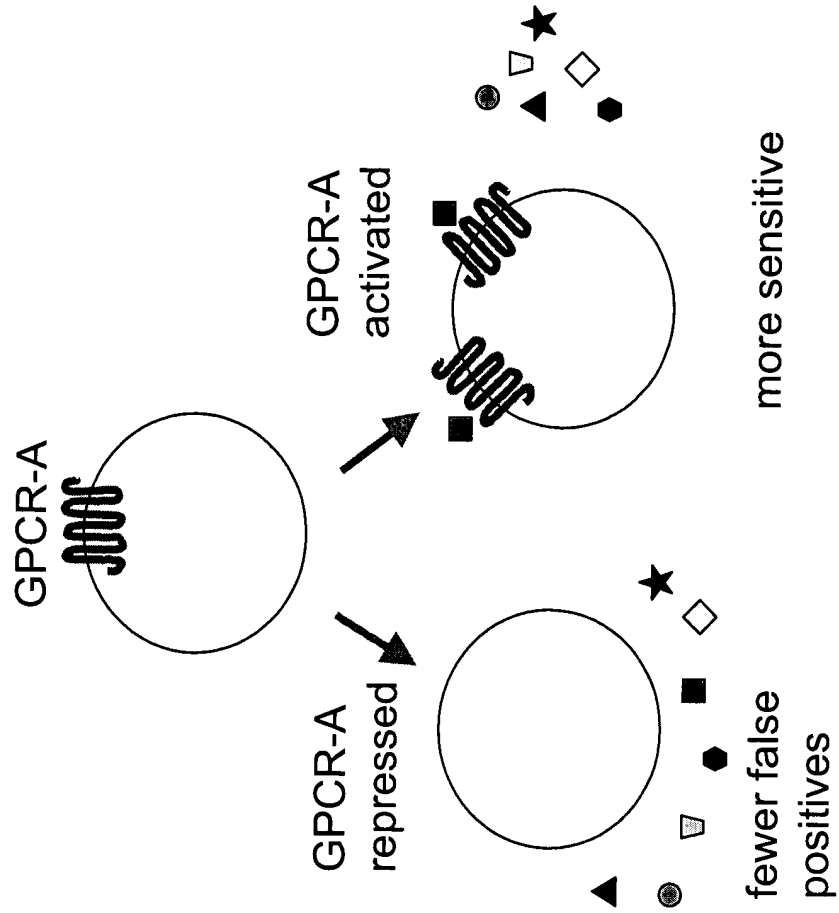


FIG. 2

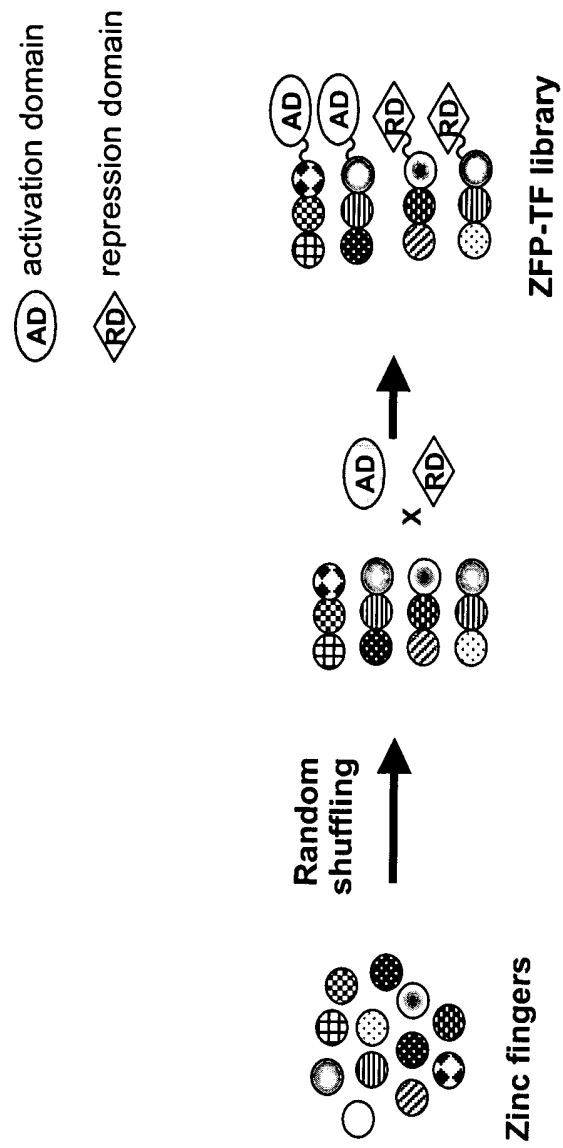


FIG. 3A

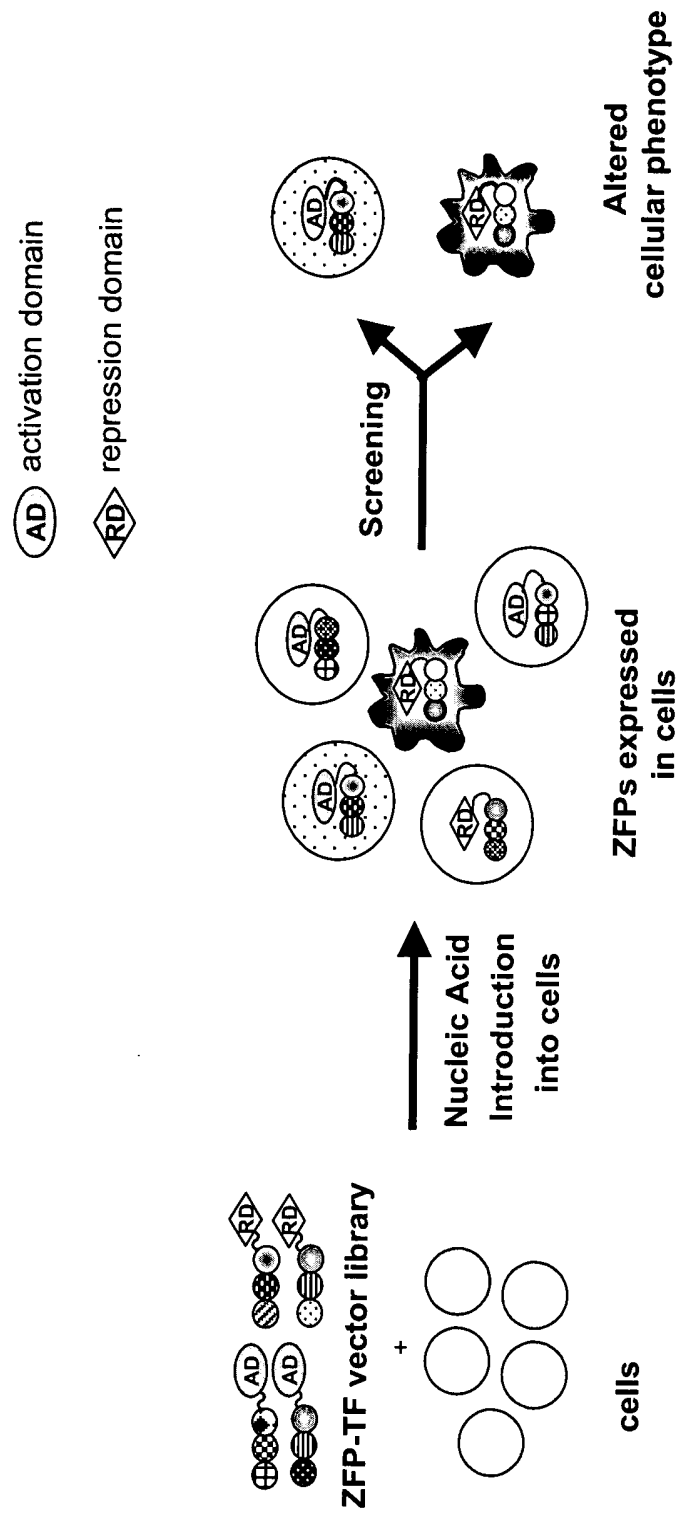
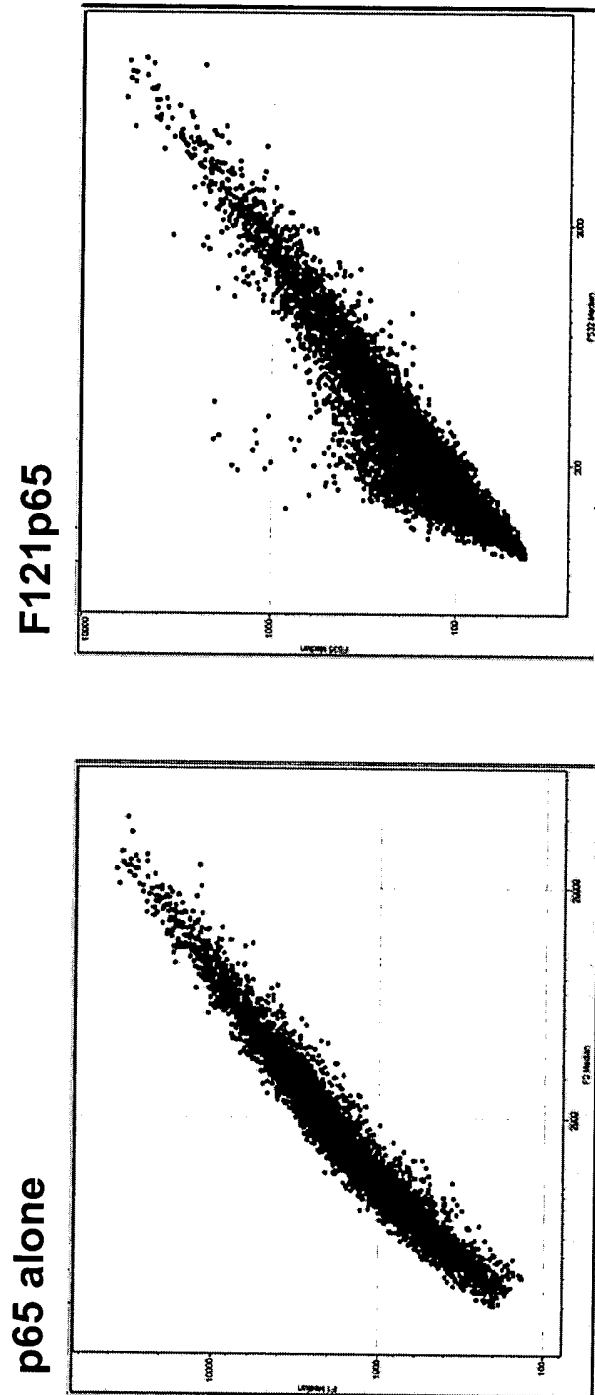


FIG. 3B



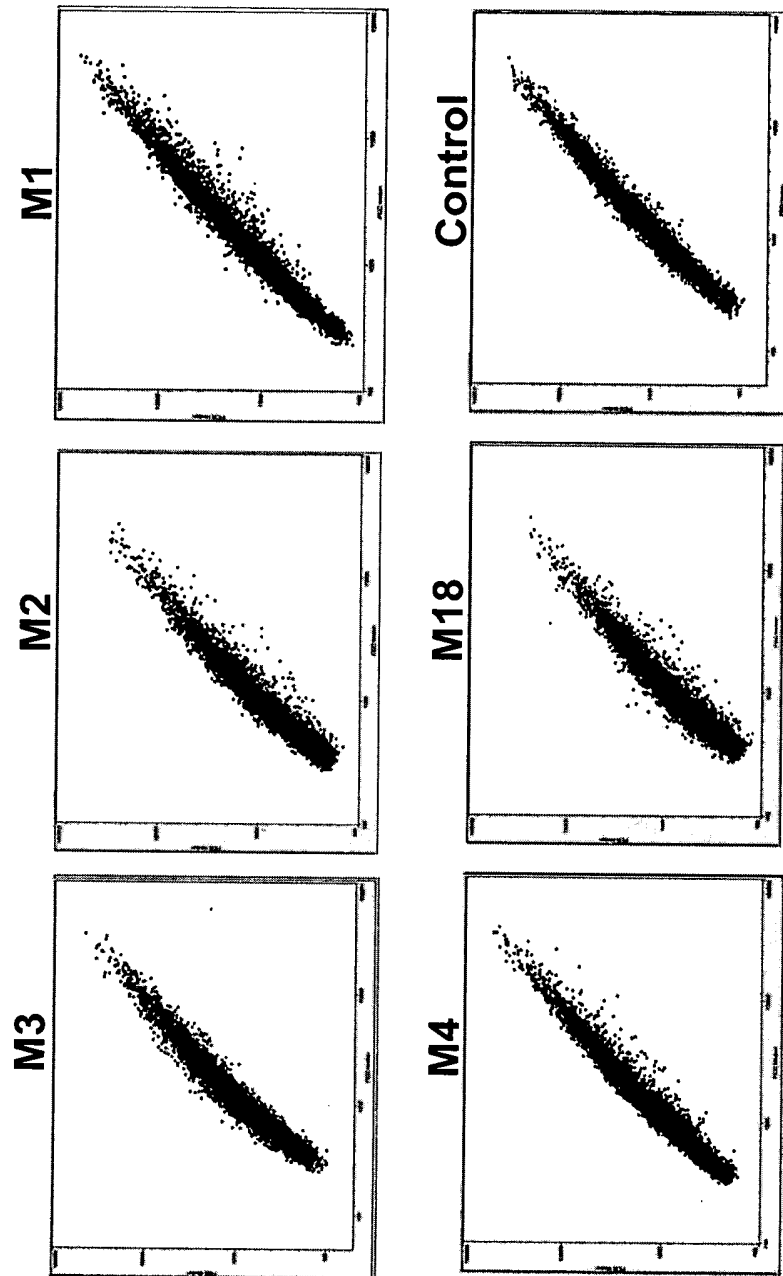


FIG. 5

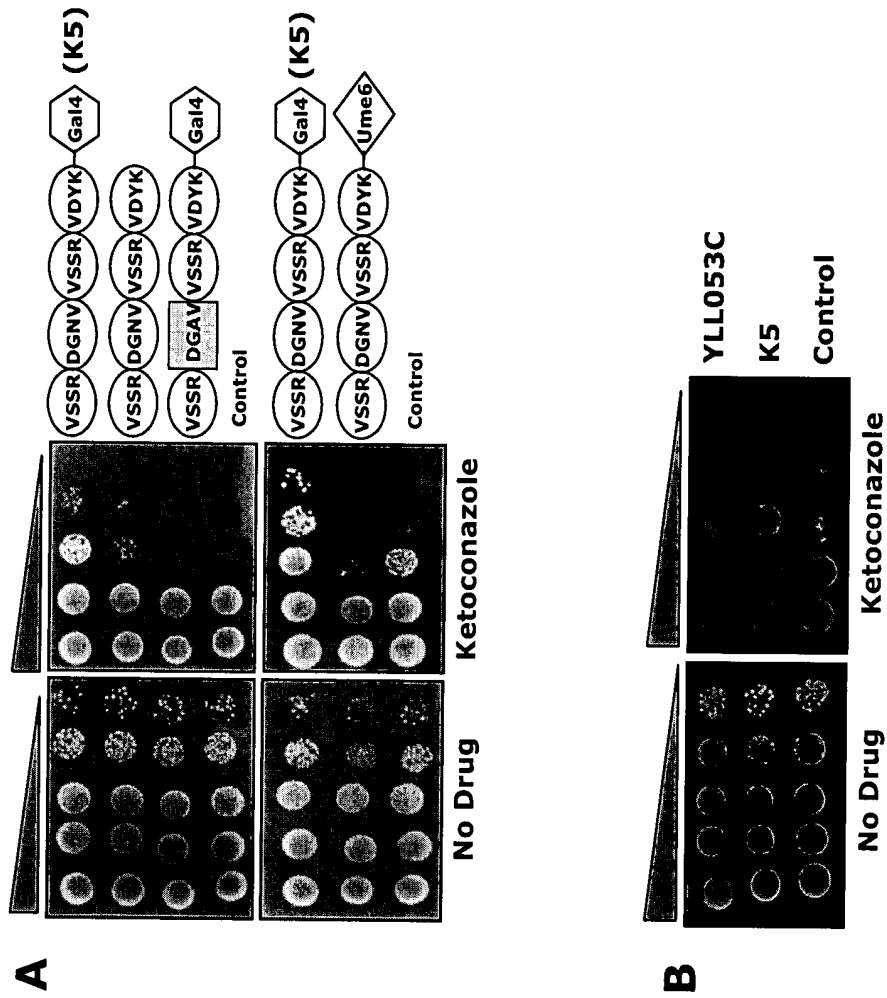


FIG. 6

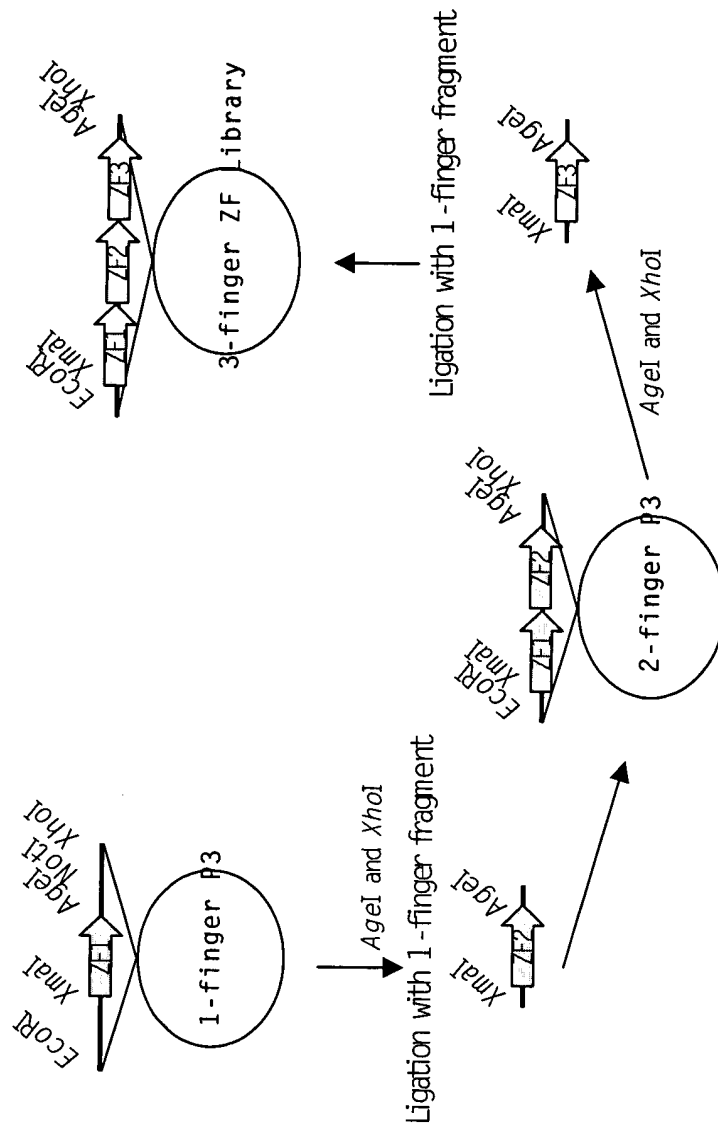


FIG. 7

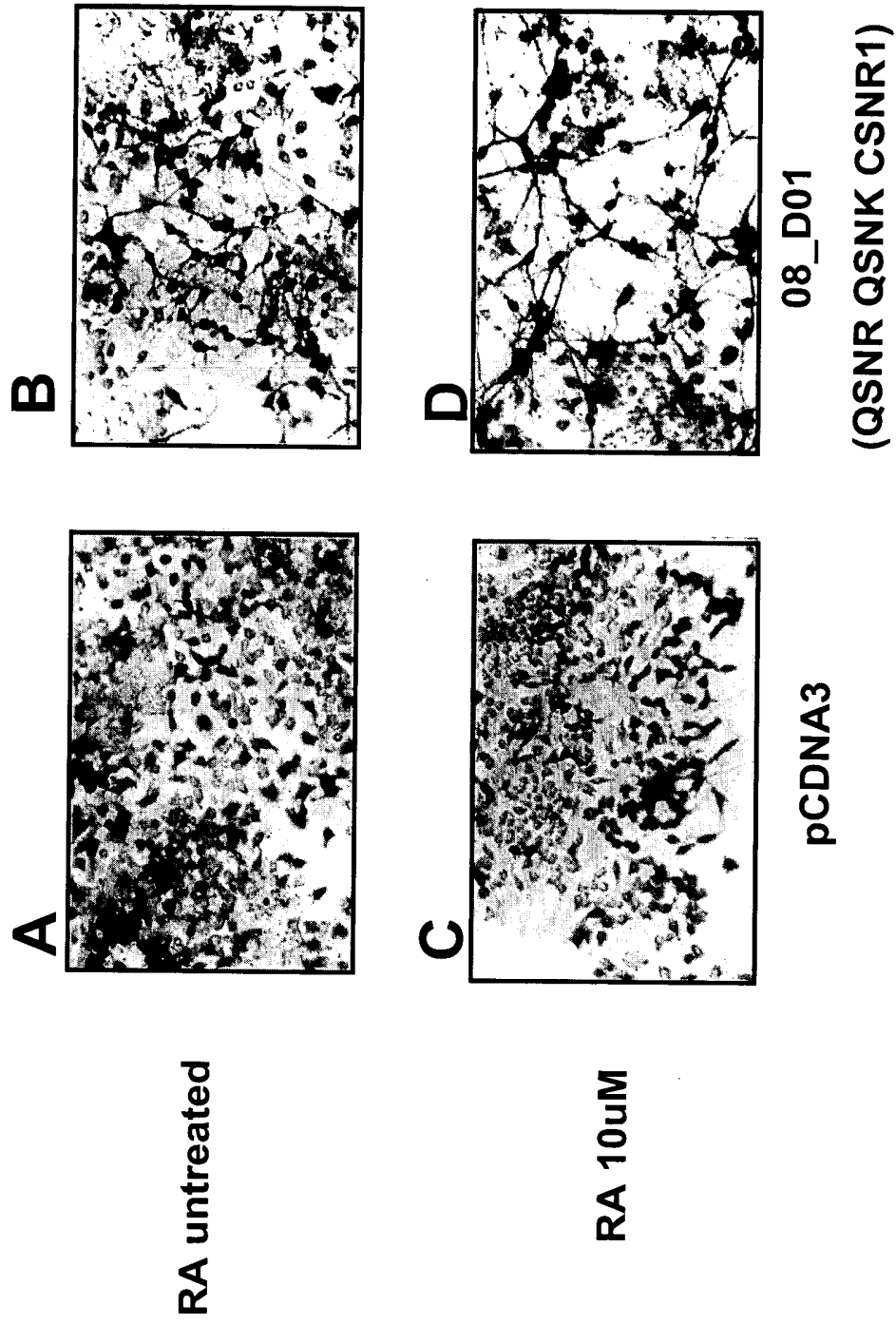


FIG. 8

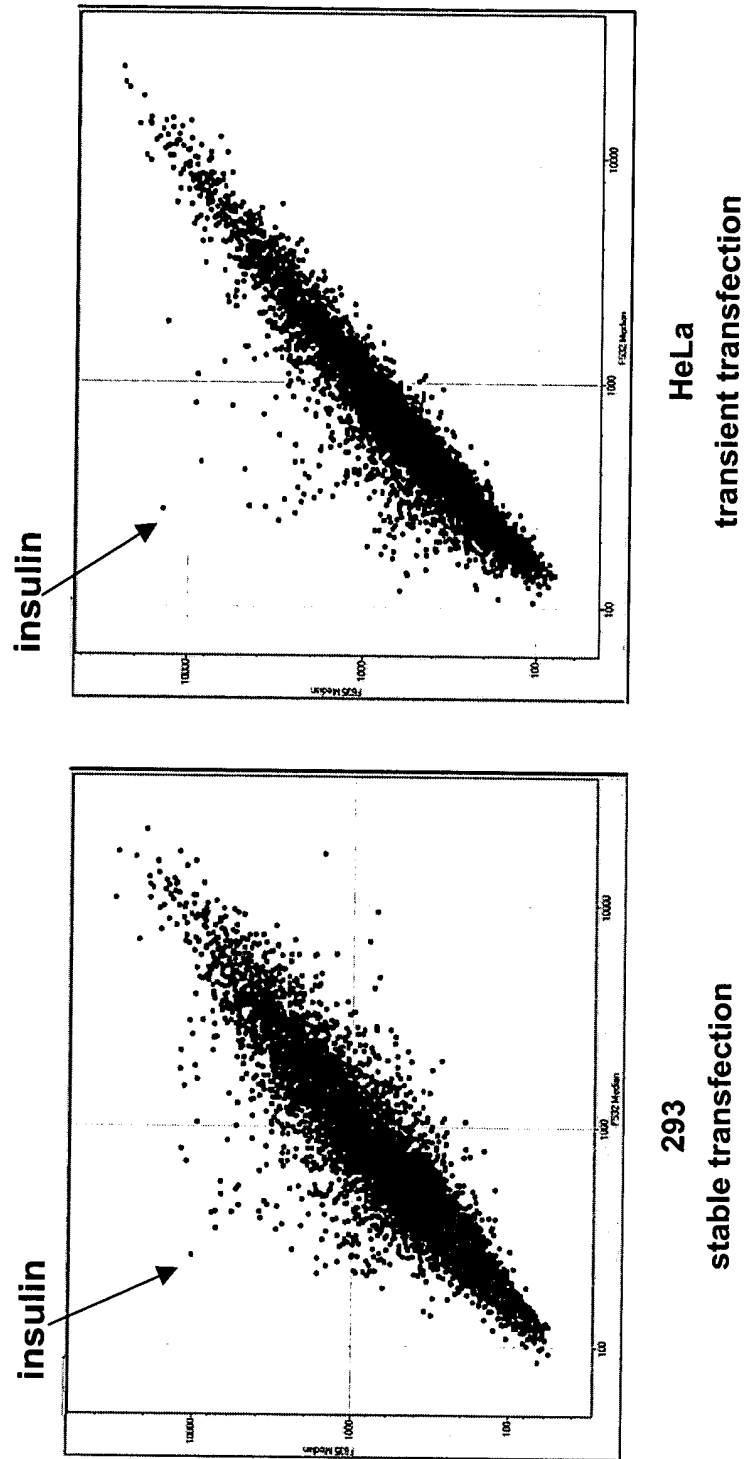


FIG. 9

**A partial directory of zinc
finger-DNA interactions**

3-bp sequence	zinc finger
GAA	QSNR
GAC	CSNR
GAG	RSNR
GAT	ISNR
GCA	QSSR
GCC	-
GCG	RDER
GCT	VSTR

FIG. 10A

Mixing and matching zinc fingers

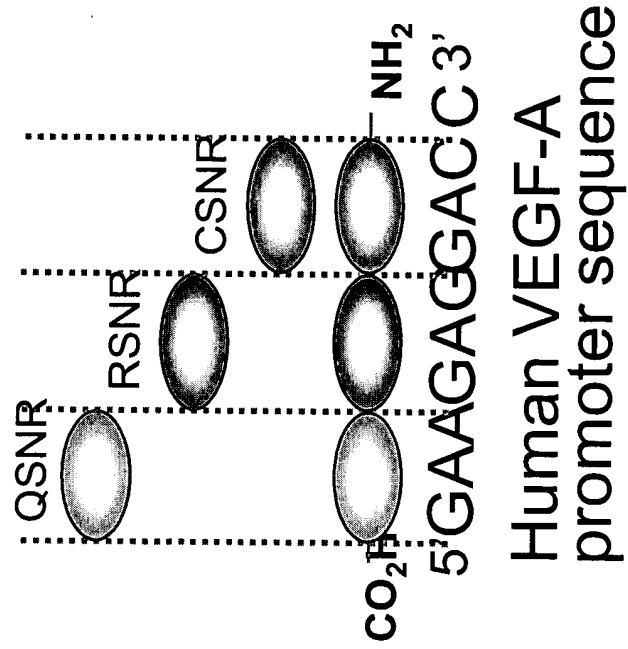


FIG. 10B

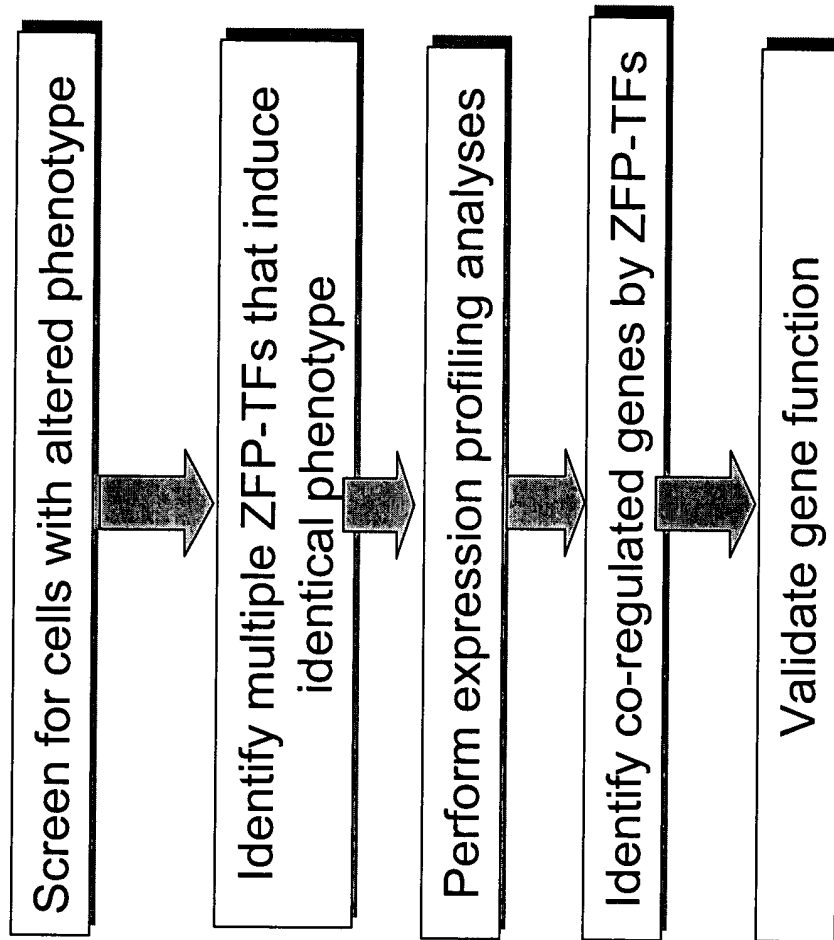


FIG. 11

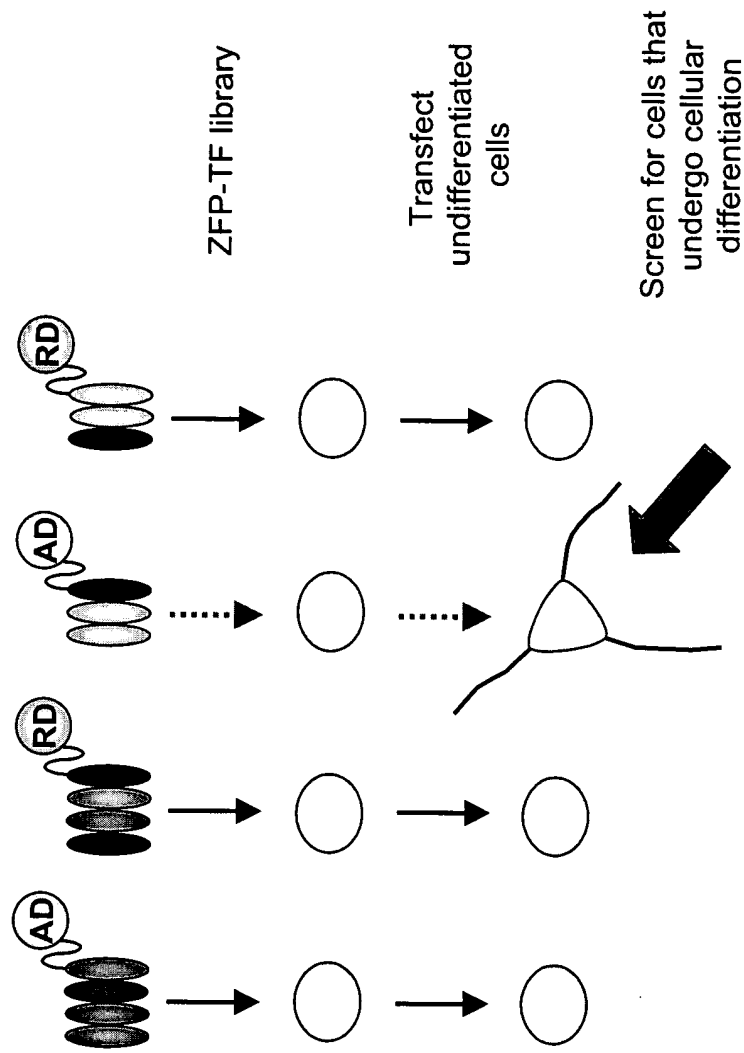


FIG. 12

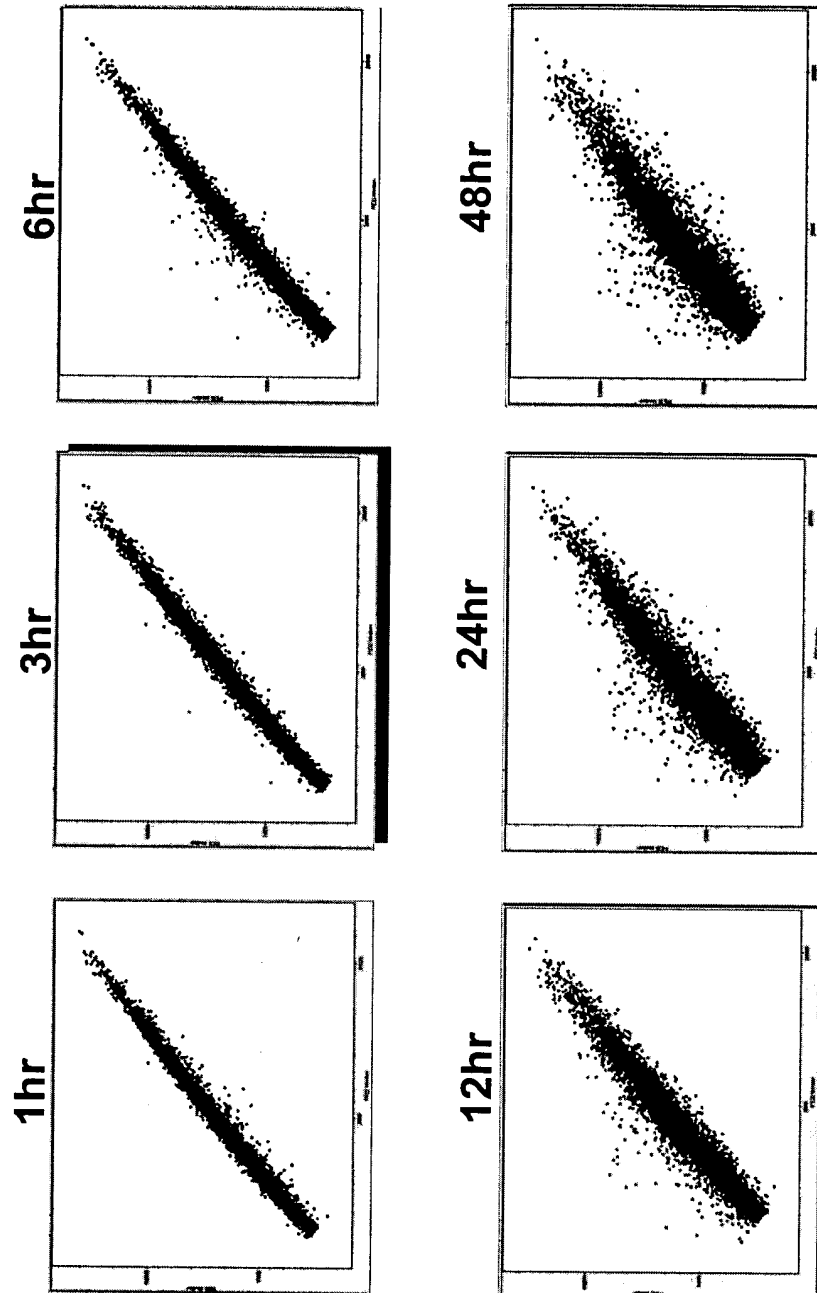


FIG. 13

NEURO1-P65 (ALSO CALLED 08_D1)

QSNR1-QSNK-CSNR1-p65

NUCLEIC ACID SEQUENCE

ATGGTGTACCCCTACGACGTGCCCAGCTACGCCGAATTGCTCCAAAAAGAAGAGAAAGGTA

ATCCgaattcccggggaaaaaccgTTTGAGTGTAAGATTGCGGGAAAGCTTTCATTAGAAAGTCA

AACCTCATCAGACACCAGAGAACTCACaccggggaaaaaccgTACAAGTGTGAAGAATGTGGCAAA

GCTTTTACCCAATCTCAAACCTTACTAAACATAAGAAAATTCATaccggggaaaaaccgTATAAA

TGTAAGCAATGTGGGAAAGCTTTTGGATGTCCCTCAAACCTTCGAAGGCATGGAAGGACTCACacc

ggtgaaaaagcgggcgctaaattcTACCTGCCAGATACAGACGATCGTCACCGGATTGAGGAGAAA

CGTAAAAGGACATATGAGACCTTCAAGAGCATCATGAAGAAGAGTCCTTTCAGCGGACCCACCGAC

CCCCGGCTCCACCTCGACGCATTGCTGTGCCTTCCCGCAGCTCAGCTTCTGTCCCAAGCCAGCA

CCCCAGCCCTATCCCTTTACGTCATCCCTGAGCACCATCAACTATGATGAGTTTCCCACCATGGTG

TTTCCTTCTGGGCAGATCAGCCAGGCCTCGGCCTTGGCCCCGGCCCCCTCCCAAGTCCTGCCCCAG

GCTCCAGCCCCTGCCCCTGCTCCAGCCATGGTATCAGCTCTGGCCCAGGCCCCAGCCCCTGTCCCA

GTCCTAGCCCCAGGCCCTCCTCAGGCTGTGGCCCCACCTGCCCCAAGCCCACCAGGCTGGGGAA

GGAACGCTGTCAGAGGCCCTGCTGCAGCTGCAGTTTGATGATGAAGACCTGGGGGCCTTGCTTGGC

AACAGCACAGACCCAGCTGTGTTACAGACCTGGCATCCGTCGACAACTCCGAGTTTCAGCAGCTG

CTGAACCAGGGCATACTGTGGCCCCCACACAACTGAGCCCATGCTGATGGAGTACCCTGAGGCT

ATAACTCGCCTAGTGACAGCCCAGAGGCCCCCGACCCAGCTCCTGCTCCACTGGGGGGCCCCGGGG

CTCCCCAATGGCCTCCTTTAGGAGATGAAGACTTCTCCTCCATTGCGGACATGGACTTCTCAGCC

CTGCTGAGTCAG TAA (SEQ ID NO:1)

PROTEIN SEQUENCE

MVYPYDVPDYAELPPKKRKVGIRIPGEKPFECKDCGKAFIQKSNLIRHQRTHTGEKPYKCEECGK

AFTQSSNLTKHKKIHTGEKPYKCKQCGKAFGCPSNLRRHGRTHTGEKAAAKFYLPDTDDRHRIEEK

RKRTYETFKSIMKKS PFSGPTDPRPPPRRIAVPSRSSASVPKPAPQYPYFTSSLSTINYDEFPTMV

FPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGE

GTLSEALLQLQFDDDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGI PVAPHTTEPMLMEYPEA

ITRLVTAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLSQ (SEQ ID NO:2)

FIG. 14

OSTEO1-P65 (ALSO CALLED S045-15-D11)

RDKR-QTHR1-VSTR-RDKR-p65

NUCLEIC ACID SEQUENCE

ATGGTGTACCCCTACGACGTGCCCCACTACGCCGAATTGCTCCAAAAAGAAGAGAAAGGTAAGG
ATCCgaattcccggggaaaaaacgTATGTATGCGATGTAGAGGGATGTACGTGGAAATTTGCCCGC
TCAGATAAGCTCAACAGACACAAGAAAAGGCACaccggggaaaaaacgTATGAGTGTACGATTGC
GGAAAGTCCTTTAGGCAGAGCACCCACCTACTCGGCACCGGAGGATCCACaccggggaaaaaacg
TATGAGTGTAAATTACTGTGAAAAACCTTTAGTGTGAGCTCAACCCTTATTAGACATCAGAGAATC
CACaccggggaaaaaacgTATGTATGCGATGTAGAGGGATGTACGTGGAAATTTGCCCGCTCAGAT
AAGCTCAACAGACACAAGAAAAGGCACaccggtgaaaaagcgccgctaaattcTACCTGCCAGAT
ACAGACGATCGTCACCGGATTGAGGAGAAACGTAAAAGGACATATGAGACCTTCAAGAGCATCATG
AAGAAGAGTCCTTTTACGCGGACCCACCGACCCCGGCCTCCACCTCGACGCATTGCTGTGCCTTCC
CGCAGCTCAGCTTCTGTCCCCAAGCCAGCACCCAGCCCTATCCCTTTACGTCATCCCTGAGCACC
ATCAACTATGATGAGTTTCCCACCATGGTGTTCCTTCTGGGCAGATCAGCCAGGCCTCGGCCTTG
GCCCCGGCCCCCTCCCAAGTCCTGCCCCAGGCTCCAGCCCCTGCCCCCTGCTCCAGCCATGGTATCA
GCTCTGGCCCAGGCCCCAGCCCCTGTCCCAGTCCTAGCCCCAGGCCCTCCTCAGGCTGTGGCCCCA
CCTGCCCCCAAGCCCACCCAGGCTGGGGAAGGAACGCTGTGAGAGGCCCTGCTGCAGCTGCAGTTT
GATGATGAAGACCTGGGGGCCTTGCTTGGCAACAGCACAGACCCAGCTGTGTTACAGACCTGGCA
TCCGTCGACAACTCCGAGTTTCAGCAGCTGCTGAACCAGGGCATACTGTGGCCCCCACACAAC
GAGCCCATGCTGATGGAGTACCCTGAGGCTATAACTCGCCTAGTGACAGCCCAGAGGCCCCCCGAC
CCAGCTCCTGCTCCACTGGGGGCCCCGGGGCTCCCAATGGCCTCCTTTCAGGAGATGAAGACTTC
TCCTCCATTGCGGACATGGACTTCTCAGCCCTGCTGAGTCAG TAA (SEQ ID NO:3)

PROTEIN SEQUENCE

MVYPYDVPDYAELPPKKRKVGIRIPGEKP YVCDVEGCTWKFARSDKLNHRHKKRHTGEKP
YCHDCGKSFRQSTHLTRHRRHTGEKP YECNYCGKTFVSSTLIRHQRIHTGEKP YVCD
VEGCTWKFARSDKLNHRHKKRHTGEKAAAKFYLPDTPDRHRIEERKRTYETFKSIMKKSP
FSGPTDPRPPPRRIAVPSRSSASVPKPAPQYPFTSSLSTINYDEFPTMVFPSPGQISQAS
ALAPAPPQVLPQAPAPAPAPAMVSALAQAAPVPVLAPGPPQAVAPPAPKPTQAGEGTL
EALLQLQFDDDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGI PVAPHTTEPMLMEYP
EAITRLVTAQRPPDPAPAPLGLPGLNGLLSGDEDFSSIADMDFSALLSQ (SEQ ID NO:4)

FIG. 15

08_D04_p65:

RSHR-RDHT-VSSR-p65

NUCLEIC ACID SEQUENCE

ATGGTGTACCCCTACGACGTGCCCGACTACGCCGAATTGCCTCCAAAAAAGAAGAGAAAGGTAGGG
ATCCgaattcccggggaaaaaccgTATAAGTGCATGGAGTGTGGGAAGGCTTTTAACCGCAGGTCA
CACCTCACACGGCACCAGCGGATTACaccgggggaaaaaccgTTCCAGTGTAAACTTGTACAGCGA
AAGTTCTCCCGGTCCGACCACCTGAAGACCCACACCAGGACTCATaccgggggaaaaaccgTATACA
TGTAACAGTGTGGGAAGCCTTCAGTGTTCAGTTCCTTCGAAGACATGAAACCACTCACacc
ggtgaaaaagcgggccgctaaattcTACCTGCCAGATACAGACGATCGTCACCGGATTGAGGAGAAA
CGTAAAAGGACATATGAGACCTTCAAGAGCATCATGAAGAAGAGTCCTTTCAGCGGACCCACCGAC
CCCCGGCCTCCACCTCGACGCATTGCTGTGCCTTCCCGCAGCTCAGCTTCTGTCCCAAGCCAGCA
CCCCAGCCCTATCCCTTTACGTCATCCCTGAGCACCATCAACTATGATGAGTTTCCCACCATGGTG
TTTCCTTCTGGGCAGATCAGCCAGGCCTCGGCCTTGGCCCCGGCCCCCTCCCAAGTCCTGCCCCAG
GCTCCAGCCCCTGCCCCTGCTCCAGCCATGGTATCAGCTCTGGCCCAGGCCCCAGCCCCTGTCCCA
GTCCTAGCCCCAGGCCCTCCTCAGGCTGTGGCCCCACCTGCCCCAAGCCCACCCAGGCTGGGGAA
GGAACGCTGTCAGAGGCCCTGCTGCAGCTGCAGTTTGATGATGAAGACCTGGGGGCCTTGCTTGGC
AACAGCACAGACCAGCTGTGTTACAGACCTGGCATCCGTCGACAACTCCGAGTTTCAGCAGCTG
CTGAACCAGGGCATACTGTGGCCCCCACAACTGAGCCCATGCTGATGGAGTACCCTGAGGCT
ATAACTCGCCTAGTGACAGCCAGAGGCCCCCGACCCAGCTCCTGCTCCACTGGGGGCCCCGGGG
CTCCCCAATGGCCTCCTTTTCAGGAGATGAAGACTTCTCCTCCATTGCGGACATGGACTTCTCAGCC
CTGCTGAGTCAG TAA (SEQ ID NO:5)

PROTEIN SEQUENCE

MVYPYDVPDYAELPPKKRKVGIRIPGEKPYKMECGKAFNRRSHLTRHQRIHTGEKPFQCKTCQR
KFSRSDHLKTHTRHTGEKPYTCKQCGKAFSVSSSLRRHETHTGEKAAAFYLPDTPDRHRIEEK
RKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQYPFTSSLSTINYDEFPTMV
FPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGE
GTLSEALLQLQFDDDLGALLGNSTDAVFDTLASVDNSEFQQLLNQGI PVAPHTTEPMLMEYPEA
ITRLVTAQRPPDPAPAPLGA~~PL~~PNGLLSGDEDFSSIADMDFSALLSQ (SEQ ID NO:6)

FIG. 16

Name: P_B08

QSNR1-DSNR-DSNR-p65

NUCLEIC ACID SEQUENCE

ATGGTGTACCCCTACGACGTGCCCGACTACGCCGAATTG CCTCCAAAAAAGAAGAGAAAGGTA GGG
ATCCgaattcccggggaaaaaccgTTTGAGTGTAAGATTGCGGGAAAGCTTTCATTTCAGAAGTCA
AACCTCATCAGACACCAGAGAACTCACaccgggggaaaaaccgTATGCTTGCCCTGTCGAGTCTCTGC
GATCGCCGCTTTTCTGATTCTGTCGAACCTTACCCGCCATATCCGCATCCACaccgggggaaaaaccg
TATGCTTGCCCTGTCGAGTCTGCGATCGCCGCTTTTCTGATTCTGTCGAACCTTACCCGCCATATC
CGCATCCACaccggtgaaaaagcgggccgctaaattcTACCTGCCAGATACAGACGATCGTCACCGG
ATTGAGGAGAAACGTAAGGACATATGAGACCTTCAAGAGCATCATGAAGAAGAGTCTTTTCAGC
GGACCCACCGACCCCGGCCTCCACCTCGACGATTGCTGTGCCTTCCCGCAGCTCAGCTTCTGTC
CCCAAGCCAGCACCCAGCCCTATCCCTTACGTCATCCCTGAGCACCATCAACTATGATGAGTTT
CCCACCATGGTGTTTCTTCTGGGCAGATCAGCCAGGCCTCGGCCTTGGCCCCGGCCCCCTCCCCAA
GTCCTGCCCCAGGCTCCAGCCCTGCCCCCTGCTCCAGCCATGGTATCAGCTCTGGCCCAGGCCCCA
GCCCCCTGTCCAGTCCTAGCCCCAGGCCCTCCTCAGGCTGTGGCCCCACCTGCCCCCAAGCCCACC
CAGGCTGGGGAAGGAACGCTGTCAGAGGCCCTGCTGCAGCTGCAGTTTGATGATGAAGACCTGGGG
GCCTTGCTTGGCAACAGCACAGACCCAGCTGTGTTACAGACCTGGCATCCGTCGACAACCTCCGAG
TTTCAGCAGCTGCTGAACCAGGGCATACTGTGGCCCCCACACAACCTGAGCCCATGCTGATGGAG
TACCCTGAGGCTATAACTCGCCTAGTGACAGCCAGAGGCCCCCCGACCCAGCTCCTGCTCCACTG
GGGGCCCCGGGGCTCCCCAATGGCCTCCTTTCAGGAGATGAAGACTTCTCCTCCATTGCGGACATG
GACTTCTCAGCCCTGCTGAGTCAG TAA (SEQ ID NO:7)

PROTEIN SEQUENCE

MVYPYDVPDYAELPPKKRKVGIRIPGEKP FECKDCGKAFTQKSNLIRHQRTHTGEKPYACPVESC
DRRFSDSSNLTRHIRIHTGEKPYACPVESCDRRFSDSSNLTRHIRIHTGEKAAKFYLPDTDDRHR
IEEKRKRTYETFKSIMKKS PFSGPTDPRPPPRRIAVPSRSSASVPKPAPQYPFTSSLSTINYDEF
PTMVFP SGQISQASALAPAPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPT
QAGEGTLSEALLQLQFDDDLGALLGNSTDAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLME
YPEAITRLVTAQRPPDPAPAPL GAPGLPNGLLSGDEDFSSIADMDFSALLSQ (SEQ ID NO:8)

FIG. 17

Name: K_D10

QSHV-WSNR-WSNR-RDNQ-kid

NUCLEIC ACID SEQUENCE

ATGGTGTACCCCTACGACGTGCCCGACTACGCCGAATTG CCTCCAAAAAAGAAGAGAAAGGTA GGG
ATCCgaattcccggggaaaaaccgTATGAGTGTGATCACTGTGGAAATCCTTTAGCCAGAGCTCT
CATCTGAATGTGCACAAAAGAACTCACaccgggggaaaaaccgTACAGATGTGAGGAATGTGGCAAA
GCCTTTAGGTGGCCCTCAAACCTTACTAGACATAAGAGAATTCACaccgggggaaaaaccgTACAGA
TGTGAGGAATGTGGCAAAGCCTTTAGGTGGCCCTCAAACCTTACTAGACATAAGAGAATTCACacc
ggggaaaaaccgTTTGCCTGCCCTGAGTGTCTAAGCGCTTCATGAGATCCGACAACCTGACCCAG
CATATCAAGACCCACaccggtgaaaaagcgggcgctaaattcGTGTCAGTGACATTTGAAGATGTG
GCTGTGCTCTTTACTCGGGACGAGTGAAGAAGCTGGATCTGTCTCAGAGAAGCCTGTACCGTGAG
GTGATGCTGGAGAATTACAGCAACCTGGCCTCCATGGCAGGATTCCTGTTTACCAAACCAAAGGTG
ATCTCCCTGTTGCAGCAAGGAGAGGATCCCTGGTAA (SEQ ID NO:9)

PROTEIN SEQUENCE

MVYPYDVPDYAELPPKKRKVGIRIPGEKP YECDHCGKSFSQSSHLNVHKRTHTGEKPYRCEECK
AFRWPSNLTRHKRIHTGEKPYRCEECKAFRWPSNLTRHKRIHTGEKPFACPECPKRFRMSDNLQ
HIKTHTEKAAAKFVSVTFEDVAVLFTRDEWKKLDLSQRSLYREVMLENYSNLASMAGFLFTKPKV
ISLLQQGEDPW (SEQ ID NO:10)

FIG. 18

Name: K_F02

DSAR2-RDKR-RDER1-QTHR1-kid

NUCLEIC ACID SEQUENCE

ATGGTGTACCCCTACGACGTGCCCCGACTACGCCGAATTG CCTCCAAAAAGAAGAGAAAGGTA GGG
ATCCgaattcccggggaaaaaccgTACTCCTGTGGCATTGTGGCAAATCCTTCTCTGACTCCAGT
GCCAAAAGGAGACACTGCATTCTACACaccggggaaaaaccgTATGTATGCGATGTAGAGGGATGT
ACGTGGAAATTTGCCCGCTCAGATAAGCTCAACAGACACAAGAAAAGGCACaccggggaaaaaccg
TATGTATGCGATGTAGAGGGATGTACGTGGAAATTTGCCCGCTCAGATGAGCTCAACAGACACAAG
AAAAGGCACaccggggaaaaaccgTATGAGTGTACGATTGCGGAAAGTCCTTTAGGCAGAGCACC
CACCTCACTCGGCACCGGAGGATCCACaccggtgaaaaagcgcccgctaaattcGTGTCAGTGACA
TTTGAAGATGTGGCTGTGCTCTTTACTCGGGACGAGTGGAAGAAGCTGGATCTGTCTCAGAGAAGC
CTGTACCGTGAGGTGATGCTGGAGAATTACAGCAACCTGGCCTCCATGGCAGGATTCCTGTTTACC
AAACCAAAGGTGATCTCCCTGTTGCAGCAAGGAGAGGATCCCTGGTAA (SEQ ID NO:11)

PROTEIN SEQUENCE

MVYPYDVPDYAELPPKKRKVGIRIPGEKP YSCGICGKSFS DSSAKRRHCILHTGEKP YVCDVEGC
TWKFARSDKLN RHKKRHTGEKP YVCDVEGCTWK FARSD ELNRHKKRHTGEKP YECHDCGKSFRQST
HLTRHRR IHTGEKAAAKFVSVTFEDVAVLFTRDEWKKLDLSQRS LYREV MLNYSNLAS MAGFLFT
KPKVISLLQQGEDPW (SEQ ID NO:12)

FIG. 19

Name: K 44_11_D01

QSHV-QSNI-QTHR1-CSNR1-KID

NUCLEIC ACID SEQUENCE

ATGGTGTACCCCTACGACGTGCCCGACTACGCCGAATTG CCTCCAAAAAAGAAGAGAAAGGTA GGG
ATCCgaattcccggggaaaaaccgTATGAGTGTGATCACTGTGGAAATCCTTTAGCCAGAGCTCT
CATCTGAATGTGCACAAAAGAACTCACaccgggggaaaaaccgTACATGTGCAGTGAGTGTGGGCGA
GGCTTCAGCCAGAAGTCAAACCTCATCATACACCAGAGGACACACaccgggggaaaaaccgTATGAG
TGTACGATTGCGGAAAGTCCTTTAGGCAGAGACCCACCTCACTCGGCACCGGAGGATCCACacc
ggggaaaaaccgTATAAATGTAAGCAATGTGGGAAAGCTTTTGGATGTCCCTCAAACCTTCGAAGG
CATGGAAGGACTCACaccggtgaaaaagcgggccgctaaattcGTGTCAGTGACATTTGAAGATGTG
GCTGTGCTCTTTACTCGGGACGAGTGGAAGAAGCTGGATCTGTCTCAGAGAAGCCTGTACCGTGAG
GTGATGCTGGAGAATTACAGCAACCTGGCCTCCATGGCAGGATTCCTGTTTACCAAACCAAAGGTG
ATCTCCCTGTTGCAGCAAGGAGAGGATCCCTGGTAA (SEQ ID NO:13)

PROTEIN SEQUENCE

MVYPYDVPDYAELPPKKRKVGIRIPGEKP YECDHCGKSFSQSSHLNVHKRTHTGEKP YMCSECGR
GFSQKSNLI IHQRTHTGEKPYECHDCGKSFRQSTHLTRHRRITHTGEKP YKCKQCGKAFGCPSNLRR
HGRTHTGEKAAAKFVSVTFEDVAVLFTRDEWKLDLSQRSLYREVMLENYSNLASMAGFLFTKPKV
ISLLQQGEDPW (SEQ ID NO:14)

FIG. 20

Name: K 44_11_G12

QSHV-VSTR-RDNQ-QTHR1-kid

NUCLEIC ACID SEQUENCE

ATGGTGTACCCCTACGACGTGCCCCACTACGCCGAATTGCCTCCAAAAAAGAAGAGAA
AGGTAGGGATCCgaattccggggaaaaaccgTATGAGTGTGATCACTGTGGAAAATCCTTTAGCC
AGAGCTCTCATCTGAATGTGCACAAAAGAACTCACaccggggaaaaaccgTATGAGTGTAAATTA
CTGTGGAAAAACCTTTAGTGTGAGCTCAACCCTTATTAGACATCAGAGAATCCACaccggg
gaaaaaccgTTTGCCTGCCCTGAGTGTCTAAGCGCTTCATGAGATCCGACAACCTGACCCA
GCATATCAAGACCCACaccggggaaaaaccgTATGAGTGTACGATTGCGGAAAGTCCTTTAGG
CAGAGCACCCACCTCACTCGGCACCGGAGGATCCACaccggtgaaaaagcgccgctaattcGTGTC
AGTGACATTTGAAGATGTGGCTGTGCTCTTTACTCGGGACGAGTGGAAGAAGCTGGATC
TGTCTCAGAGAAGCCTGTACCGTGAGGTGATGCTGGAGAATTACAGCAACCTGGCCTCC
ATGGCAGGATTCCTGTTTACCAAACCAAAGGTGATCTCCCTGTTGCAGCAAGGAGAGGA
TCCCTGGTAA (SEQ ID NO:15)

PROTEIN SEQUENCE

MVYPYDVPDYAELPPKKRKVGIRIPGEKPYECDHCGKSFSQSSHLNVHKRTHTGEKPYECNYCGK
TFSVSSTLIRHQRIHTGGEKPFACPECPKRFMRSDNLQHIKTHTGGEKPYECDHCGKSFRQSTHLTR
HRRIHTGEKAAAKFVSVTFEDVAVLFTTRDEWKKLDLSQRSLYREVMLENYSNLASMAGFLFTKPKV
ISLLQQGEDPW (SEQ ID NO:16)

FIG. 21

F104_p65

RDHT-RSHR-QSHR2-p65

NUCLEIC ACID SEQUENCE

ATGGTGTACCCCTACGACGTGCCCCGACTACGCCGAATTG[CCTCCAAAAAAGAAGAGAAAGGTA]GGG
ATCC**gaattc**ccgggggaaaaaccgTTCCAGTGTAAACTTGTCAGCGAAAGTTCTCCCGGTCCGAC
CACCTGAAGACCCACACCAGGACTCATaccgggggaaaaaccgTATAAGTGCATGGAGTGTGGGAAG
GCTTTTAACCGCAGGTACACCTCACACGGCACCAGCGGATTCAcaccgggggaaaaaccgTATAAA
TGCGGCCAGTGTGGGAAGTTCTACTCGCAGGTCTCCACCTCACCCGCCACCAGAAAATCCACacc
ggtgaaaaa**gcggccgc**taaattcTACCTGCCAGATACAGACGATCGTCACCGGATTGAGGAGAAA
CGTAAAAGGACATATGAGACCTTCAAGAGCATCATGAAGAAGAGTCCTTTCAGCGGACCCACCGAC
CCCCGGCCTCCACCTCGACGCATTGCTGTGCCTTCCCGCAGCTCAGCTTCTGTCCCCAAGCCAGCA
CCCCAGCCCTATCCCTTTACGTCATCCCTGAGCACCATCAACTATGATGAGTTTCCCACCATGGTG
TTTCCTTCTGGGCAGATCAGCCAGGCCTCGGCCTTGGCCCCGGCCCCCTCCCCAAGTCCTGCCCCAG
GCTCCAGCCCCTGCCCCTGCTCCAGCCATGGTATCAGCTCTGGCCCAGGCCCCAGCCCCTGTCCCA
GTCCTAGCCCCAGGCCCTCCTCAGGCTGTGGCCCCACCTGCCCCCAAGCCCACCCAGGCTGGGGAA
GGAACGCTGTCAGAGGCCCTGCTGCAGCTGCAGTTTGATGATGAAGACCTGGGGGCCTTGCTTGGC
AACAGCACAGACCCAGCTGTGTTACAGACCTGGCATCCGTCGACAACTCCGAGTTTCAGCAGCTG
CTGAACCAGGGCATACTGTGGCCCCCACACAACTGAGCCCATGCTGATGGAGTACCCTGAGGCT
ATAACTCGCCTAGTGACAGCCCAGAGGCCCCCCGACCCAGCTCCTGCTCCACTGGGGGCCCCGGGG
CTCCCCAATGGCCTCCTTTCAGGAGATGAAGACTTCTCCTCCATTGCGGACATGGACTTCTCAGCC
CTGCTGAGTCAG TAA (SEQ ID NO:17)

PROTEIN SEQUENCE

MVYPYDVPDYAELPPKKRKRKVGIRIPGEKP**FQCKTCQRKFSRSDHLKTHTRHT**GEKP**YKCMCEGK**
AFNRRSHLTRHQRIHTGEKP**YKCGQCGKFYSQVSHLTRHQKIHT**GEKAAAKFYLPDTDDRHRIEEK
RKRTYETFKSIMKKSFPSPGPTDPRPPPRRIAVPSRSSASVPKPAPQYPFTSSLSTINYDEFPTMV
FPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAAPAPVPVLAPGPPQAVAPPAPKPTQAGE
GTLSEALLQLQFDDDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGI PVAPHTTEPMLMEYPEA
ITRLVTAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLSQ (SEQ ID NO:18)

FIG. 22

F121_p65

QSHR-RSHR-RDHT-p65

NUCLEIC ACID SEQUENCE

ATGGTGTACCCCTACGACGTGCCCGACTACGCCGAATTGCTCCAAAAAGAAGAGAAAGGTAAGGG
ATCCgaattcccggggaaaaaccgTACAAATGTGAAGAATGTGGCAAAGCCTTTAGGCAGTCCTCA
CACCTTACTACACATAAGATAATTCATaccggggaaaaaccgTATAAGTGCATGGAGTGTGGGAAG
GCTTTTAACCGCAGGTCACACCTCACACGGCACCAGCGGATTCACaccggggaaaaaccgTTCCAG
TGTAAAACTTGTACGCGAAAGTTCTCCCGGTCCGACCACCTGAAGACCCACACCAGGACTCATacc
ggtgaaaaagcgggccgctaaattcTACCTGCCAGATACAGACGATCGTCACCGGATTGAGGAGAAA
CGTAAAGGACATATGAGACCTTCAAGAGCATCATGAAGAAGAGTCCTTTACGCGGACCCACCGAC
CCCCGGCCTCCACCTCGACGCATTGCTGTGCCTTCCCGCAGCTCAGCTTCTGTCCCAAGCCAGCA
CCCCAGCCCTATCCCTTTACGTCATCCCTGAGCACCATCAACTATGATGAGTTTCCCACCATGGTG
TTTCCTTCTGGGCAGATCAGCCAGGCCTCGGCCTTGGCCCCGGCCCCCTCCCCAAGTCCTGCCCCAG
GCTCCAGCCCCTGCCCCCTGCTCCAGCCATGGTATCAGCTCTGGCCCAGGCCCCAGCCCCTGTCCCA
GTCCTAGCCCCAGGCCCTCCTCAGGCTGTGGCCCCACCTGCCCCCAAGCCACCAGGCTGGGGAA
GGAACGCTGTCAGAGGCCCTGCTGCAGCTGCAGTTTGTATGATGAAGACCTGGGGGCCTTGCTTGGC
AACAGCACAGACCCAGCTGTGTTACAGACCTGGCATCCGTCGACAACTCCGAGTTTCAGCAGCTG
CTGAACCAGGGCATACCTGTGGCCCCCACAACTGAGCCCATGCTGATGGAGTACCCTGAGGCT
ATAACTCGCCTAGTGACAGCCCAGAGGCCCCCCGACCCAGCTCCTGCTCCACTGGGGGCCCCGGGG
CTCCCCAATGGCCTCCTTTTACAGGAGATGAAGACTTCTCCTCCATTGCGGACATGGACTTCTCAGCC
CTGCTGAGTCAG TAA (SEQ ID NO:19)

PROTEIN SEQUENCE

MVYPYDVPDYAELPPKKRKVGIRIPGEKP YKCEECGKAFRQSSHLTTHKI IHTGEKP YKMECGK
AFNRRSHLTRHQRIHTGEKP FQCKTCQRKFSRSDHLKTHTRHTGEKAAKFYLPDTDDRHRIEEK
RKRTYETFKSIMKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQYPFTSSLSTINYDEFPTMV
FPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGE
GTLSEALLQLQFDDDLGALLGNSTDPVFTDLASVDNSEFQQLNQGIPVAPHTTEPMLMEYPEA
ITRLVTAQRPPDPAPAPLGAAPGLPNGLLSGDEDFSSIADMDFSALLSQ (SEQ ID NO:20)

FIG. 23

K12_A11

RDHT-QSNV2-QTHR1-QFNR-kid

ATGGTGTACCCCTACGACGTGCCCCGACTACGCCGAATTGCCTCCAAAAAGAAGAGAAAGGTA
GGGATCCgaattccccggggaaaaaccgTTCCAGTGTAACCTTGTCAGCGAAAGTTCTCCCGG
TCCGACCACCTGAAGACCCACACCAGGACTCATaccggggaaaaaccgTATGTTTGCTCAAAA
TGTGGGAAAGCCTTCACTCAGAGTTCAAATCTGACTGTACATCAAAAATCCACaccggggaa
aaaccgTATGAGTGTCACGATTGCGGAAAGTCCTTTAGGCAGAGCACCCACCTCACTCGGCAC
CGGAGGATCCACaccggggaaaaaccgTATAAGTGTCATCAATGTGGGAAAGCCTTTATTCAA
TCCTTTAACCTTCGAAGACATGAGAGAACTCACaccggtgaaaaagcggccgctaaattcGTG
TCAGTGACATTTGAAGATGTGGCTGTGCTCTTTACTCGGGACGAGTGGAAGAAGCTGGATCTG
TCTCAGAGAAGCCTGTACCGTGAGGTGATGCTGGAGAATTACAGCAACCTGGCCTCCATGGCA
GGATTCCTGTTTACCAAACCAAAGGTGATCTCCCTGTTGCAGCAAGGAGAGGATCCCTGGTAA

(SEQ ID NO:259)

MVYPYDVPDYAELPPKKRKVGIRIPGEKPFQCKTCQRKFSRSDHLKTHTRHTGEKPYVCSK
CGKAFTQSSNLTVHQKIHTGEKPYECHDCGKSFRQSTHLTRHRRIHHTGEKPYKCHQCGKAFIQ
SFNLRRHERHTHTGEKAAAKFVSVTFEDVAVLFTRDEWKKLDLSQRSLYREVMLENYSNLASMA
GFLFTKPKVISLLOQGEDPW (SEQ ID NO:260)

FIG. 24

K44-16-E12

QSHV-QSSR1-QTHR1-kid

ATGGTGTACCCCTACGACGTGCCCGACTACGCCGAATTGCTCCAAAAAGAAGAGAAAGGTA
GGGATCCgaattcccggggaaaaaccgTATGAGTGTGATCACTGTGGAAATCCTTTAGCCAG
AGCTCTCATCTGAATGTGCACAAAAGAACTCACaccgggggaaaaaccgTATAAGTGCCCTGAT
TGTGGGAAGAGTTTTAGTCAGAGTTCCAGCCTCATTGCCACCAGCGGACACACaccggggaa
aaaccgTATGAGTGTACGATTGCGGAAAGTCCTTTAGGCAGAGCACCCACCTCACTCGGCAC
CGGAGGATCCACaccggtgaaaaagcgggcgctaaattcGTGTCAGTGACATTTGAAGATGTG
GCTGTGCTCTTTACTCGGGACGAGTGGAAGAAGCTGGATCTGTCTCAGAGAAGCCTGTACCGT
GAGGTGATGCTGGAGAATTACAGCAACCTGGCCTCCATGGCAGGATTCCTGTTTACCAAACCA
AAGGTGATCTCCCTGTTGCAGCAAGGAGAGGATCCCTGGTAA (SEQ ID NO:261)

MVYPYDVPDYAELPPKKRKVGIRIPGEKPYECDHCGKSFSQSSHLNVHKRTHTEKPE
YKCPDCGKSFSQSSSLIRHQRTHTGEKPYECHDCGKSFRQSTHLTRHRRITHTGEKAAA
KFVSVTFEDVAVLFTRDEWKKLDLSQRSLYREVMLENYSNLASMAGFLFTKPKVISLL
QOGEDPW (SEQ ID NO:262)

FIG. 25